

What is claimed:

- 1 1. A method for forming an air bearing surface on a slider, comprising,
2 providing a silicon slider body;
3 forming at least one trench in a surface of the silicon body; and
4 forming a structure selected from the group consisting of a carbide structure and a
5 nitride structure in the at least one trench.
- 1 2. A method as in claim 1, wherein the structure comprises a carbide structure.
- 1 3. A method as in claim 1, further comprising forming at least one of a read
2 element and a write element on the surface after forming the structure.
- 1 4. A method as in claim 1, further comprising forming a carbon layer over at
2 least a portion of the silicon body on the surface of the slider.
- 1 5. A method as in claim 1, further comprising forming the trench by etching a
2 portion of the silicon body.
- 1 6. A method as in claim 2, further comprising forming a layer between the
2 silicon body and the carbide structure.
- 1 7. A method as in claim 6, wherein the layer comprises a material comprising
2 titanium.
- 1 8. A method as in claim 6, wherein the layer comprises a material that improves
2 adhesion between the carbide and the silicon.

1 9. A method as in claim 2, wherein the carbide structure is formed by a process
2 comprising:

3 filling the trench in the silicon body with a metal carbide and anhydrous metal
4 chloride material;

5 heating the silicon body so that the metal carbide and anhydrous metal chloride
6 material becomes a melt;

7 after the heating the silicon body, cooling the silicon body to produce a product
8 material from metal carbide and anhydrous metal chloride material; and

9 removing chloride material formed from the product material.

1 10. A method as in claim 9, further comprising, after the heating the silicon body
2 so that the metal carbide and anhydrous metal chloride material becomes a melt, annealing
3 the silicon body for a predetermined time period.

1 11. A method as in claim 9, wherein removing chloride material comprises
2 rinsing the surface of the material with at least one liquid selected from the group consisting
3 of water and methanol to remove the chloride material.

1 12. A method as in claim 9, further comprising planarizing the carbide using a
2 method selected from the group consisting of etching and polishing.

1 13. A method as in claim 12, further comprising etching the silicon slider body
2 so that the carbide extends outward from the etched silicon slider body.

1 14. A method as in claim 9, wherein the heating the silicon body comprises
2 heating the metal carbide and anhydrous metal chloride material to a temperature of at least
3 450°C.

1 15. A method as in claim 1, wherein the structure comprises a nitride structure.

1 16. A method for forming a slider comprising:
2 forming at least one trench into a silicon body;
3 forming an air bearing surface pad structure in the trench that extends to a position at
4 or above the silicon body; and
5 forming a read/write head on the silicon body after forming the air bearing surface
6 pad structure.

1 17. A method as in claim 16, wherein the air bearing surface pad structure
2 comprises a material selected from the group consisting of a carbide material and a nitride
3 material.

1 18. A method as in claim 16, further comprising:
2 forming at least one groove in the silicon body extending from a first position at or
3 adjacent to the read/write head to second position at or adjacent to an edge of the slider;
4 forming an insulating layer in the groove; and
5 forming a conducting layer on the insulating layer in the groove to provide an
6 electrical path between the read/write head and the edge of the slider.

1 19. A method as in claim 16, wherein the silicon slider body is formed from a
2 material consisting of single crystal silicon.

1 20. A method as in claim 16, wherein the read/write structure is formed to
2 include an atomic force microscopy tip.

1 21. A method for processing a slider, comprising:
2 forming at least one trench in a silicon slider body;
3 depositing precursor materials in the at least one trench;
4 heating the precursor materials to form a product including a metal carbide and a
5 metal chloride; and
6 removing the metal chloride.

1 22. A method as in claim 21, further comprising forming a layer in the at least
2 one trench prior to the depositing precursor materials in the trench.

1 23. A method as in claim 21, further comprising depositing the precursor
2 materials on a surface of the silicon slider body adjacent to the at least one trench and
3 planarizing the metal carbide so that the metal carbide in the at least one trench is planarized
4 to a level identical to that of the surface of the silicon slider body adjacent to the at least one
5 trench.

1 24. A method as in claim 23, further comprising, after the planarizing the metal
2 carbide, etching the surface of the silicon slider body adjacent to the at least one trench so
3 that the metal carbide in the at least one trench extends outward relative to the etched
4 surface of the silicon slider body adjacent to the at least one trench.

1 25. A method as in claim 21, wherein the precursor materials are selected so that
2 the metal carbide comprises a carbide selected from the group consisting of titanium
3 carbide, zirconium carbide, vanadium carbide, tungsten carbide, and molybdenum carbide.

1 26. A method as in claim 21, wherein the silicon slider body is formed from a
2 material consisting of single crystal silicon:

1 27. A method as in claim 24, further comprising forming a carbon layer on at
2 least part of the etched surface of the silicon slider body.

1 28. A method as in claim 24, further comprising forming a read/write structure
2 after the etching the surface of the silicon slider body adjacent to the at least one trench.

1 29. A method as in claim 28, wherein the read/write structure is formed to
2 include an atomic force microscopy tip.